

**Developing digital tools for
ākonga kanorau-ā-roro:
A literature review of Māori
understandings of kanorau-ā-roro
and development of education-
focused digital technologies**

by
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A Research Paper completed as part of the Ngā Pae o te Māramatanga Raumati Internship Programme 2025-26 and as part of a project titled ‘Exploring Neurodivergence and Māori Wellbeing through Indigenous-Informed Technology.’. The internship was supervised Dr. Hazel Abraham and funded by the Ngā Pae o te Māramatanga 2025-26 Internship Grant.

Suggested citation: Mackie, M. (2026). Developing digital tools for ākonga kanorau-ā-roto: A literature review of Māori understandings of kanorau-ā-roto and development of education- focused digital technologies. [Internship report]. Ngā Pae o te Māramatanga. Auckland, New Zealand. <https://maramatanga.ac.nz/index.php/project/25-26INTS18>



This internship report was produced by the author as part of a NPM internship project under the supervision of the named supervisor and funded by the Ngā Pae o te Māramatanga 2025- 26 Internship Grant. The report is the work of the named intern and researchers and has been published here as provided. It may not represent the views of Ngā Pae o te Māramatanga. Any correspondence about the content should be addressed directly to the authors of the report.

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16 February 2026

ACKNOWLEDGEMENTS

Firstly, I extend my gratitude to Ngā Pae o te Māramatanga as a whole, and Sonia Garcia in particular, for the opportunity to participate in this internship. This research project meant a lot to me and I am extremely grateful to Sonia for her support and her warmth. Many nerves have been soothed by your excellent communication and kind words.

To Hazel Abraham, thank you so much for your supervision; your patience and reliability have been much appreciated. Despite being so busy, you have consistently made time for me and have always been happy to do so. Your emphasis on hauora always served as a timely reminder and I am fond of the time we spent together on this project.

I also thank my friends, my family, whose “beach?” texts were always untimely and always successfully derailed a work day. The kindness, support and acceptance know no end and I am eternally grateful to have you all in my life. Even on the most stressful of days, you guys never fail to distract me from life’s woes.

To Tiopira Mcdowell, I enrolled in your course as a general education paper, something to fill my summer. Instead, you flung the doors to te ao Māori wide open with such intensity that I cannot look back. Your teachings ignited a fire in my belly and a little whisper in my mind. The first classes of yours I took will always serve as a guiding force; tending the fire and keeping me dreaming of tino rangatiratanga. For this, I acknowledge you then, now, and forever.

Finally, I acknowledge Rei, my partner in life. Your grace and warmth still surprise me after all this time. When I get so absorbed in work I become a vacant body for weeks on end, your kindness, and care keeps me moving. With every home-cooked meal, every pick-up and every drop-off, my reverence for you deepens. I can only hope to support you one day as you have supported me during my studies.

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EXECUTIVE SUMMARY

INTRODUCTION

This report aims to understand how Māori conceptualisations of kanorau-ā-roto (neurodivergence), intersects with the rapid development of digital technologies, and how the development of digital tools may either support or hinder the wellbeing, identity, and learning outcomes of kanorau-ā-roto Māori (Māori neurodivergence learners).

In order to achieve this goal, three research aims were developed.

Aim 1:

To explore how kanorau-ā-roto is understood within te ao Māori and how these understandings shape the experiences of kanorau-ā-roto Māori learners in education contexts.

Aim 2:

To examine how digital tools are currently designed, implemented, and accessed by Māori, with a particular focus on their impact on kanorau-ā-roto learners' wellbeing, identity, and learning outcomes.

Aim 3:

To identify culturally grounded, mana-enhancing practices and design principles that can support the development of digital tools that better serve kanorau-ā-roto Māori learners in education contexts.

A narrative literature review, heavily influenced by a kaupapa Māori framework, was conducted by asking the following research questions for the co-creation of the literature review. Findings were produced through thematic analysis, and triangulation with my supervisor alongside kaupapa Māori principles of research.

FINDINGS

Research Question One:

How is kanorau-ā-roro understood within te ao Māori, and how do these understandings shape the experiences of kanorau-ā-roro Māori in educational contexts?

In response to this question, five main themes emerged from within the literature:

1. Traditional Understandings of Kanorau-ā-roro and Disability
2. The Relevance of Cultural Identity
3. Impacts of Western Care Frameworks on Kanorau-ā-roro Māori
4. Disconnect is Disabling: An Alternative Perspective of Disability
5. Cultural Connection as a Pillar of Health

Research Question Two:

How are Māori designing, implementing, and accessing digital tools for the purpose of improving Māori learner's educational experiences?

Furthermore, five main themes arose from my exploration of the literature:

1. Safe and appropriate collection and use of Māori data
2. Kia whakatōmuri te haere whakamua: Frameworks
3. Whakawhanaungatanga: The Role of Relationships
4. Pedagogy
5. Barriers and Limitations

DISCUSSION

The next section involves a discussion of my findings related to the two research questions and their findings are synthesised to address each of the key research aims and ultimately provide recommendations for the development of digital tools for kanorau-ā-roro Māori. The research finds that the development of kanorau-ā-roro Māori-focused digital tools would provide a great service to Māori communities if they are developed according to tikanga Māori, Māori health models and with a strong sense of contexts and collective needs.

INTRODUCTION

In this ever-changing world, the ways we live, understand, and connect with one another are undergoing fundamental shifts. In the health sector, for example, mainstream models of care are evolving to include previously overlooked holistic, interpersonal, and social determinant components (Hickey & Wilson, 2017). Similarly, in education, rapidly evolving digital technologies are reshaping learning experiences, access pathways, and the relationships between learners, teachers, and communities (Rood & Barbour, 2024).

Meanwhile, Indigenous communities worldwide are addressing the deep and enduring effects of colonisation that have destroyed knowledge systems, educational structures, and cultural identities. For Māori, these colonial legacies not only dictate how individuals are perceived and supported, but also how digital technologies carry risks of misrepresentation, data exploitation, and further marginalisation if they are not developed through appropriate tikanga and governance (Munn, 2024).

In lieu of the fundamental shifts in thinking occurring around the world, Māori have been on a pathway of cultural revitalisation that began in the 1980s (Smith, 2003). Beginning with the development of Te Kōhanga Reo (Māori-medium early childhood education), cultural revitalisation practices have taken root in sectors such as technology, education, and health (Munn, 2024; Rameka, 2021; Smith, 2017). Within the health sector, the oppression of Māori by hegemonic notions of disability has become a site of decolonising efforts (Jones et al., 2022). Notably, both Pākehā and Māori researchers and practitioners are attempting to redraw how we, as a society, define and interact with disability (Jones et al., 2022; Mirfin-Veitich et al., 2020).

At the same time, digital technologies are developing at a seemingly exponential pace; driving significant transformations in every aspect of society. These digital tools, including the development of generative Artificial Intelligence (AI), tend to affirm hegemonic values by destabilising work, undermining well-being and reproducing racialised and gendered inequality (Munn, 2024). These characteristics affect how Māori contribute to and influence the design of digital tools, as well as how Māori access and interact with information. As a result, the literature consistently highlights that incorporating Māori ethical, cultural, and societal perspectives into the design of digital tools is essential for improving Māori outcomes (Hudson & Whaanga,

2024). As AI and digital systems become further embedded in daily life, the need for Māori-led, culturally grounded approaches becomes increasingly urgent.

In consideration of developments in technology and health sectors, the purpose of this report is to understand how Māori conceptualisations of kanorau-ā-roto intersect with the rapid development of digital technologies, and how the development of digital tools may either support or hinder the wellbeing, identity, and learning outcomes of kanorau-ā-roto Māori. As digital environments increasingly shape how people learn, communicate, and access services, it is becoming essential to examine how these systems align, or conflict, with the values and worldview of te ao Māori. Against this backdrop, this report conducts a literature review of Māori-focused kanorau-ā-roto and digital technology theory with hopes to identify key areas of importance and potential next steps for research in this space.

Goal of the Report

The author envisages that this research will contribute to deeper discussion about the opportunities and challenges that arise when developing and using digital tools to support kanorau-ā-roto Māori learners. In particular, this report seeks to identify the cultural, educational, and technological practices that are most effective in enhancing Māori learner wellbeing, identity, and achievement. With this purpose in mind, and to ensure the scope of the project remains focused, three research aims were developed to shape the direction of this study:

Aim 1:

To explore how kanorau-ā-roto is understood within te ao Māori and how these understandings shape the experiences of kanorau-ā-roto Māori learners in education contexts.

Aim 2:

To examine how digital tools are currently designed, implemented, and accessed by Māori, with a particular focus on their impact on kanorau-ā-roto learners' wellbeing, identity, and learning outcomes.

Aim 3:

To identify culturally grounded, mana-enhancing practices and design principles that can support the development of digital tools that better serve kanorau-ā-roto Māori learners in education contexts.

METHODOLOGY

REVIEW METHODOLOGY

A literature review was identified as the most appropriate method to achieve the aims of this report. While both systematic and scoping literature review styles were considered, ultimately a narrative style literature review methodology was selected for its alignment to kaupapa Māori values. The unrestricted and flexible nature of a narrative literature review is reflective of a te ao Māori worldview where fluidity is fundamental features of many core concepts (Kennedy & Jefferies, 2009). Moreover, where, in many Western research methodologies, biases are frowned upon, Kaupapa Māori Theory (KMT) encourages its researchers to locate themselves within their research and be aware of where they are connected and disconnected from the content (Smith, 2015). A narrative review style allows more room for the research team to assess literature based on its perceived relevance and without restriction from tight exclusion and inclusion criteria. It is for these reasons a narrative review was chosen.

The first step in this review process was to establish a research question. In lieu of the goals of this report and its respective aims, our research question explores:

How do Māori conceptualisations of kanorau-ā-roto differ from Western frameworks, and how do these understandings influence the development of digital technologies for the educational purposes of kanorau-ā-roto Māori learners?

From this question a key theme was developed: the intersection of Māori conceptualisations of kanorau-ā-roto and Māori centered digital technologies within educational spaces. However, across the literature, no resources were found that addressed the relationship of kanorau-ā-roto and digital tools from a Māori perspective. As a result, the original research question was split

into two with the goal of braiding the findings together in order to address the three research aims.

Research Question One:

How is kanorau-ā-roto understood within te ao Māori, and how do these understandings shape the experiences of kanorau-ā-roto Māori in educational contexts?

Research Question Two:

How are Māori designing, implementing, and accessing digital tools for the purpose of improving Māori learner's educational experiences?

In order to answer these research questions a series of keywords were entered into google scholar and the University of Auckland Library database. These keywords were: neurodivergence, Māori, education, digital technology, AI. The results were gathered and any article or report that did not directly center Māori was excluded. This search gathered a total of $n=33$ articles.

From there, articles were included or excluded based on their relevance to either kanorau-ā-roto, and digital technologies. Articles were generally excluded if they did not relate specifically to education. However, the literature on Māori understandings of kanorau-ā-roto was extremely limited so the scope was broadened to include articles that focused on disability broadly, opposed to kanorau-ā-roto specifically. Articles that could not be accessed were also excluded. Additionally, some relevant materials were located by other members of the research team or in the bibliographies of articles from the original search. After the exclusion process the number of articles was $n=20$. $N=9$ of these articles focused on kanorau-ā-roto and were used to review research question one, $n=11$ focused on digital technologies and were used to review research question two.

KAUPAPA MĀORI FRAMEWORK

This report is informed by a Kaupapa Māori Framework. Kaupapa Māori became popularised in the 1980s as part of the Māori language movement and has developed into a theoretical framework that incorporates a Māori worldview and centralises te reo Māori me ōna tikanga (Māori language and customs) (Pihama et al., 2002). Central to KMT are six key principles, all of which underpinned and informed the creation of this report:

- Tino rangatiratanga (the self-determination principle)
- Taonga tuku iho (the cultural aspirations principle)
- Ako Māori (the culturally preferred pedagogy principle)
- Kia piki ake i nga raruraru o te kainga (the socioeconomic mediation principle)
- Whānau (the extended family structure principle)
- Kaupapa (the collective philosophy principle) (Pihama et al., 2002, pp. 34.)

TERMINOLOGY AND DEFINITIONS

Te reo Māori

In line with a Kaupapa Māori approach that centers and normalises te reo Māori, core Māori values and concepts are not translated in this report. Translations are provided for topic specific concepts and terms.

Topic Specific Concepts

Māori are a diverse group of people who often operate at whānau and hapū levels rather than as iwi or Māori as a whole ethnic group (Cliffe-Tuatari, 2020). As a result, mātauranga Māori is a varied set of knowledge that contains, and welcomes, contradictions and dualities (Cliffe-Tautari, 2020). As a result, the terminology used in this report may differ from terminology used elsewhere.

Kanorau-ā-ro-ro

There are various Māori translations for neurodiversity, however this report translates both neurodiversity and neurodivergence as kanorau-ā-ro-ro. When broken down *kanorau* means to be diverse or varied and *ro-ro* refers to the brain, amongst other things (Riwai-Couch, 2021). Despite my use of this Māori term, I note that translating a Western concept into te reo Māori does not make the concept automatically compatible with mātauranga Māori. Moreover, translating concepts may act as a barrier to reconceptualising mental health services (Kopua & Skirrow, 2023).

Aroreretini

Aroreretini acts as a translation for Attention Deficit Hyperactivity Disorder (ADHD). Despite Kopua's words, I decided to use this Māori translation as I find its meaning 'mind goes to many things' more encompassing than 'Attention Deficit Hyperactivity Disorder' (Kopua & Skirrow, 2023).

Takiwātanga

The same follows for this translation of Autism, Takiwātanga, which is used throughout this report. The term Takiwātanga means 'in their own time/space' which is less deficit-invoking than the term 'Autism Spectrum Disorder' (Tupou et al., 2024).

Disabled/ Disability

Regretfully, the literature I reviewed did not provide a mana-enhancing alternative for the terms disabled and disability. The terms disabled and disability perpetuate hegemonic narratives that 'other' disabled individuals and is widely recognised as outdated (Hickey & Wilson, 2017). However the terms are used in this report in order to accurately reflect the content of the literature reviewed.

FINDINGS

MĀORI AND KANORAU-Ā-RORO

Introduction

This section aims to review the literature relevant to Research Question One:

How is kanorau-ā-roro understood within te ao Māori, and how do these understandings shape the experiences of kanorau-ā-roro Māori in educational contexts?

Due to the limited availability of literature on this topic, very few pieces focused on kanorau-ā-roro in particular. Most of the literature examined disability as an umbrella term, occasionally focusing on specific disabilities when relevant. While the literature was limited and restricted to a few key researchers, there was a strong consensus on ideas and themes.

From the literature reviewed, five key themes emerged:

1. Traditional Understandings of Kanorau-ā-roro and Disability
2. The Relevance of Cultural Identity
3. Impacts of Western Care Frameworks on Kanorau-ā-roro Māori
4. Disconnect is Disabling: An Alternative Perspective of Disability
5. Cultural Connection as a Pillar of Health

Each theme contained various sub-themes and will ultimately be synthesised with Research Question Two in order to address the aforementioned research aims.

Traditional Understandings of Kanorau-ā-roro and Disability

As noted in the literature, a major problem Māori research into kanorau-ā-roro and disability has had to face is the absence of disability and kanorau-ā-roro in recorded written and oral histories as well as an overwhelming lack of literature on the subject (Rangiwai, 2024). This can be attributed to two reasons. Firstly, knowledge is held in histories that are inaccessible to researchers (Riwai-Couch, 2021), and, secondly, disabilities and kanorau-ā-roro were not

understood as distinct within traditional Māori society. With a sense of finality, Bevan-Brown (2013) stated that there was no Māori term equivalent to intellectual disability.

The research provided two main theories of why there is no traditional Māori notion of disability. Firstly, Māori societal structures are collective based and each person in that collective contributes based on their strengths rather than filling a predetermined role. Jones et al. (2024) noted that participants described marae as a place where everyone contributes in different ways and all contributions were valued. Secondly, the holistic and interconnected nature of te ao Māori means that a person is understood through their relationships and contributions rather than their differences (Hickey & Wilson, 2017). Berryman and Woller (2013) describe this notion through whakapapa and whanaungatanga which is echoed by Bevan-Brown (as cited in Riwai-Couch, 2021):

This view was linked to the concepts of whanaungatanga and collective wellbeing as opposed to individual personal dysfunction. Because of this collective view there was a strong sense of moral obligation for whānau to look after and care for any family member with a disability. (p.16)

Individuals contributed to the collective in whatever way they could and the collective, because of their responsibility to uphold whanaungatanga, embraced the individual and their contributions. Therefore, there was little need to highlight or define disabilities.

Connection to Atua

Occasionally, disability was mentioned or alluded to in histories. Traditionally, Bevan-Brown (2013) found disabled people were typically more spiritual and were granted a higher status within their whānau and hapū. She gave the example that vision impairments were often linked to great talents and knowledge (Bevan-Brown, 2013). Other academics noted the link between intellectual disability and various atua. Kopua and Skirrow (2023) spoke to the relevance of aroreretini in the creation story. Uepoto, a restless and curious atua, investigated a glimmer of light shining through the dark embrace of Papatūānuku and Ranginui which spurred the series of events leading to their separation. Rangiwai (2024) spoke to the similarity between

characteristics of aroreretini and Tāwhirimatea, an atua who possessed unstable impulses and large emotions.

Overall, the historical narratives on disability are minimal for the likely reason that there was no need to define disability and kanorau-ā-roto. Furthermore, as we will see, the definitions that exist within te ao Pākehā are ‘othering’ in a way that contradicts Māori ways of being to the detriment of kanorau-ā-roto and disabled Māori.

The Relevance of Cultural Identity

Māori First and Foremost

A recurring theme throughout the literature was the significance of identity to kanorau-ā-roto and disabled Māori. Riwai-Couch (2021) noted that Māori identity was just as important to Māori with intellectual disability as it was to all Māori. Jones et al. (2024) strengthened this point by adding that Māori identity was often considered to be the core identity of disabled Māori; an identity which provided strength, connection, and the ability to locate themselves within time and space. Moreover, disability as an identity was secondary and undefining. The central importance of Māori identity meant that culturally relevant education and care is of vital importance to kanorau-ā-roto and disabled Māori (Bevan-Brown, 2013).

Proximity to Whānau, Hapū and Iwi

Marginalisation of ākonga Māori in education environments was, and is, a major concern. This problem was compounded when ākonga Māori experienced learning and/or physical disabilities. Linda Tuhiwai Smith (as cited in Riwai-Couch, 2021) speaks to the profound impacts special education experiences have had on disabled Māori, some of which were removed from their families and suffered from severe cultural disconnect. Jones et al. (2024) reflects on this history and acknowledges that disconnect from te ao Māori damages the ability of disabled Māori to participate in their whānau, hapū and iwi, causing profound negative impacts on health and wellbeing. The alienation of tamariki from their whānau and community still affects Māori through various forms of inter-generational trauma. Interviews conducted by Tipene (2023), show that whānau are, at times, avoiding services due to negative and abusive experiences with the healthcare system. One parent of an aroreretini child explained “the kids won’t talk to anyone

because the social workers took them away. Because they got hurt while they were in foster care” (Tipene, 2023, p. 137).

To prevent ongoing harms, cultural connectedness and the centrality of Māori social groupings were essential to any research conducted with disabled Māori. Bevan-Brown (2013) explained that there was unanimous agreement among participants that disabled Māori were entitled to the inclusion of te ao Māori in their care and education and were best cared for in their own homes. Riwai-Couch (2021) reported that whānau want their tamariki in local schools where they are close to home, whānau and support networks. The importance of te ao Māori in effective interventions was also stressed.

Imposition of a ‘disabled’ Identity

Jones et al. (2024) noted that Māori identity was often considered to be a primary identity and kanorau-ā-roto and disabled identities were described as secondary or not acknowledged at all. Moreover, participants were frustrated that, in order to access services, they had to define themselves by their disability and unwillingly label themselves. They felt compartmentalised by Western worldviews (Jones et al., 2024). Māori unwillingness to label themselves as disabled is reflected in statistics that show Māori as less likely to access disability services than their Pākehā counterparts (Hickey & Wilson, 2017). Further research showed that Māori had a general distrust of Western health services due to the history of trauma deriving from interactions with health services (Tipene, 2023). A concern about being labelled and marginalized by health services was also expressed (Tipene, 2023).

Impacts of Western Care Frameworks on Kanorau-ā-roto Māori

Medical and Social Models of Disability

The negative impacts of Western care and treatment frameworks on disabled Māori became a major theme in the literature. Hickey and Wilson (2017) provide a brief overview of the two main disability approaches used in Western medicine: the Medical and Social models of Disability. The medical model largely ignores the individual, focusing solely on the disability and the individual's assumed deficits. For this reason, the medical model is also referred to as a

deficit-based approach. The social model of disability views disability as a product of societal barriers that impair an individual (Hickey & Wilson, 2017). Although the social model of disability attempts to move away from deficit-based approaches, it continues to center the individual and the disability without considering wider contexts (Jones et al., 2024). Hickey and Wilson (2017) critique both approaches as unable to account for holistic and collective based Indigenous worldviews. Moreover, funding and support tend to still be assigned based on deficit-based models despite the theoretical move towards the Social Model of Disability (Berryman & Woller, 2013).

Western Disability Frameworks in Education

Western disability frameworks are harming ākonga Māori by minimising their cultural identity and assigning deficit-based approaches to teaching practices. Tupou et al. (2024) note that despite a strong national emphasis on inclusion, educators are, at times, attempting to teach deficits out of takiwātanga tamariki. Deficit-based approaches are also appearing in professional development programmes which are mostly devoid of any cultural relevancy training; even though their participants are actively teaching ākonga Māori (Tupou et al., 2024). Furthermore, Bevan-Brown (2013) argues that the majority of support offered to disabled Māori is based on Western norms and values. Berryman and Woller (2013) agree with Bevan-Brown (2013) and add that the failure to provide culturally relevant special education is restricting the engagement of ākonga Māori in education and is a marginalising factor in Māori student achievement.

Disconnect is Disabling: An Alternative Perspective on Disability

Disability as an Impact of Colonisation

Kopua and Skirrow (2023) argue that medicalised approaches to disability have failed everyone by failing to consider the larger narratives affecting people. In relation to aroreretini, she argues that “simply describing behaviours that focus on an individual struggling to conform within a society that does not reflect a Māori worldview is no longer acceptable” (Kopua & Skirrow, 2023, p.2). Echoing Kopua’s perspective, many academics have put forth the notion that, for Māori, disability relates to the seizure of land and destruction of cultural identity, practices, values, and knowledge (Bevan-Brown, 2013). Jones et al. (2024) draws a connection between

the relationship between the terms ‘able/disable’ and ‘normal/abnormal,’ arguing that by claiming the status of ‘normal,’ Western worldviews push the status of ‘abnormal’ on to Indigenous communities thus turning notions of disability into a colonising tool. Hickey and Wilson (2017) add to the conversation by noting that, despite Māori having the highest disability statistics, the concept of disability did not exist prior to colonisation. They suggest that the high rate of disability is due to the historic and contemporary impacts of colonisation. This reconceptualisation of disability highlights the catastrophic consequences of colonisation on Māori and suggests that those consequences are more disabling than any particular pathology.

Intersectionality and Marginalisation

Additional findings on the treatment of disabled Māori indicate that they are often subjected to severe discrimination due to their multiple marginalised identities (Tupou et al., 2024). For example, Māori may be less likely to receive diagnosis due to institutional racism, health inequalities, and general distrust of the health system (Tipene, 2023; Tupou et al., 2024). Riwai-Couch (2021) noted that due to hegemonic cultural norms and practices, ākonga Māori are already marginalised and the addition of disability further exacerbates the marginalisation. One participant in Bevan-Brown’s (2013) research commented that teachers often want Māori kids and intellectually disabled students out of their classes as quickly as possible. The unwillingness of teachers to attend takiwātanga professional development also appeared in other research, “They’re just, ‘no,no, I can’t teach this child. I don’t know how to cope with this child” (Tupou et al., 2024, p. 709).

Cultural Connection as a Pillar of Health

Strengths-based Learning

The last theme to appear in this group of literature was an emphasis on culturally relevant health and education frameworks. In contrast to Western disability frameworks and colonial injustices, Māori lean towards a strengths/potential-based approach to education and offer a place for all ākonga Māori to grow into confident and active members of their community. Berryman & Woller (2013) find that, across their participants, everyone works towards all students reaching their potential; defining potential as standing tall as Māori and being able to participate as

bi-cultural members of society. This broad understanding of potential reflects Durie's vision (as seen in Berryman & Woller, 2013) that education should help ākonga Māori recognise their unique and individual potential. A participant also reflected on strengths-based approaches, noting that while her sons were struggling in school, they were happy and easy-going outside schools and doing different activities. She astutely noted that the school was not providing her tamariki with the correct support but there were no other education options available to her (Tipene, 2023).

Berryman and Woller (2013) found that schools that focused on student potential rather than fixing problems were more active and less reactive. They were also more likely to have interventions that were seen as positive and constructive. Tupou et al. (2024) reached a similar finding. Teachers that used relationship focused, strengths-based teaching practices were comfortable and confident teaching takiwātanga Māori. The strengths-based practices included deepening relationships, celebrating the strengths of takiwātanga Māori, and approaching teaching with a philosophy of making sure all tamariki felt loved and inherently capable. In support of strengths/potential based education, Riwai-Couch (2021) found that kanorau-ā-roro Māori were generally happier in Māori education environments. However, the lack of culturally relevant professional development and Māori kanorau-ā-roro specialists were common barriers noted throughout the literature (Bevan-Brown, 2013; Riwai-Couch, 2021; Tupou et al., 2024).

Māori Health Frameworks

Māori approaches to health and wellbeing are holistic in nature and consider upwards of four dimensions of health: taha whānau, taha wairua, taha hinengaro, and taha tinana (whānau side, spiritual side, mental side, and physical side) (Bevan-Brown, 2013). Consequently, Māori health practices should provide a more nuanced examination of an individual's wellbeing and recognise that neglecting any dimension will result in ill-health. Jones et al. (2024) observes that health and wellbeing were aligned with access to te ao Māori. Furthermore, Tipene (2023) stresses the value of whānau connections, arguing that concerns had been raised about the alienation of individuals from their whānau in mainstream health and education. She suggests that ties to whānau, hapū and iwi are essential pillars of Māori health that provide accessways to stronger wellbeing. Lastly, Tupou et al. (2024) demonstrates the effectiveness of Māori health and wellbeing

practices. They identified wellbeing as a key focus in takiwātanga Māori education, prioritising the physical and mental safety of the child and their relationships in the classroom. The focus on wellbeing was justified by arguing that ākonga Māori cannot learn when they are not safe and healthy. When wellbeing is looked after, that is when ākonga Māori learn and flourish (Tupou et al., 2024).

MĀORI AND DIGITAL TECHNOLOGIES

Introduction

This section reviews the key themes and sub themes that appeared in the literature regarding Research Question Two:

How are Māori designing, implementing and accessing digital tools for the purpose of improving ākonga Māori educational experiences?

The literature collected is varied in nature. Some of the research focuses on the development process of digital tools where other resources explore the implications of digital technologies in classrooms. Although the purposes of each piece of literature varied, underlying themes and considerations connected each piece to one another.

The five key themes are:

1. Safe and Appropriate Collection and use of Māori Data
2. Kia whakatōmuri te haere whakamua: Frameworks
3. Whakawhanaungatanga: The Role of Relationships
4. Pedagogy
5. Barriers and Limitations

Tikanga Māori

The use of Indigenous data in online spaces raised various concerns throughout the literature. Examples include: the impact on Indigenous ways of being, knowing and teaching (Tiakiwai & Tiakiwai, 2010); the collection and storage of Indigenous knowledge (Ka'ai-Mahuta, 2019); prioritization of ongoing engagement rather than single consultations with Māori (Grbic, 2016); and, a risk that the process of developing digital technologies is disconnected in a way that loses track of the foundational goals of the project (Tiakiwai & Tiakiwai, 2010). Despite the diversity of concerns, there was a general agreement that a Kaupapa Māori approach and adherence to tikanga Māori brings certain understandings to a project that protects against these concerns.

It was felt by Grbic (2016) that engagement with Māori data must occur in a way that honours and abides by tikanga Māori to ensure the correct and appropriate usage of Māori resources. Tikanga must be honoured because digital Māori resources often contain mātauranga Māori which is a highly regarded taonga with inherent mana. Grbic (2016) found that without careful adherence to tikanga Māori, developers risk diminishing the mana of the mātauranga and the people who care for it.

Kaupapa Māori Theory

Kaupapa Māori Theory (KMT) and practice is trusted to mitigate risks of the exploitation of Indigenous data, people and worldviews because it is a Māori envisioned and enacted theory. By being by Māori, with Māori, for Māori, KMT positions tino rangatiratanga and Māori cultural normalcy by centering te ao Māori and its core values and principles (Whatarau, 2019). By requiring researchers to center tikanga Māori, KMT ensures the correct questions are asked and the correct considerations made. Moreover, the flexibility of KMT allows it to adapt to many different contexts, including education, development and health. Munn (2024) recognises the importance of KMT and advocates for its use mitigating issues of Indigenous exploitation and ensuring that tikanga Māori is correctly adhered to.

Māori Data Sovereignty

Finally, the issue of Māori data sovereignty was also frequently raised. Māori data is protected under article two of Te Tiriti o Waitangi which guarantees Māori tino rangatiratanga over their whenua, kainga, and taonga (Ka'ai-Mahuta, 2019). While Māori data sovereignty is theoretically protected as taonga by te Tiriti o Waitangi, in practice it is threatened by third-party interests. In an increasingly digital world, Māori data is at risk of being collected and used incorrectly and/or without consent.

Munn (2024) provides a strong critique of AI development, citing various instances of discrimination and biases by algorithms as well as a general lack of transparency. He promotes the protection of Māori data and advocates for efforts to protect Māori data. Queniahana (2024) suggests that consultation with Māori, Māori representation in ICT leadership roles, Māori structural oversight and targeted education are all necessary steps to ensure protection of Māori data against misrepresentation, systematic inequalities and misuse of culturally significant data.

Kia whakatōmuri te haere whakamua: Frameworks

This theme begins with a whakataukī that was embraced by many of the researchers as they attempted to forge new paths for their people:

“Kia whakatōmuri te haere whakamua”

“To walk backwards into the future with our eyes fixed on the past”

Every digital development examined in this review firmly rooted their conceptual framework in te ao Māori. As people quick to utilise new technologies, Māori have started developing their own online tools, particularly in the education space (Ka'ai-Mahuta, 2019). The variety of tools and uses is numerous but a common feature appears in them all - a framework drawn from te ao Māori.

Framework Examples

Saha et al. (2024) created the conceptual framework 'He Awa Whiria' - a braided river approach, to weave together two strands of knowledge, Māori and Western. Awa are revered in te ao Māori for their role in supporting life and providing nourishment for the communities that surround

them. They provide an astute metaphor for the duality, divergence and convergence of multiple knowledge systems.

Whatarau (2019) uses waka, specifically waka culture, as the conceptual framework that underpins his research. He uses waka because they are “the vitality of Māori as it presents the value of kotahitanga (unity) and the concept of forward movement” (Whatarau, 2019, p. 12). The importance of waka to Māori is marked by the continued recognition of the waka that carried our ancestors to Aotearoa New Zealand in pepeha. Whatarau (2019) uses waka culture as a metaphor for the main components of learning and expresses a deep level of thought in the relationship between each component.

Grbic (2016) creates a digital marae to hold the mātauranga of Te Noho Kotahitanga marae in an online repository. Marae are the core of Māori society, described by Grbic (2016) as “a living entity with agency, the capacity to guide cultural practice and to teach visitors as a repository of mātauranga Māori” (p.1). Often named after an eponymous ancestor, marae metaphorically act as that ancestor’s body, storing knowledge and protecting their uri. As a repository of knowledge and pillar of te ao Māori, a marae was an appropriate framework for this project. Grbic (2016) was careful to adhere to tikanga Māori and was deliberate in building the online repository. Details like online whakatau were added for first-time visitors to ensure that they were appropriately welcomed into the digital space.

From these frameworks it is clear that each digital developer put a considerable amount of time and thought into how they may draw on te ao Māori for guidance and support in their creations. Te ao Māori frameworks provide support by weaving key principles and values into the heart of a project and acting as a reminder of tikanga Māori. By looking into the past for guidance and inspiration, the developers ensured that they were able to create new digital technologies in alignment with kaupapa Māori.

Within Technological Development

The role of relationships was critical to each piece of research. Relationships marked the beginning of many projects and defined each step of the journey. According to Whatarau (2019), the central role of relationships required researchers to reflect on tikanga Māori. Inversely, the central role played by tikanga Māori required researchers to reflect on the role of relationships. This created a flow between two core pillars of kaupapa Māori, whanaungatanga and tikanga.

The process of whakawhanaungatanga played a central role in the brainstorming process and development of various technologies. Jason Ataera established that the first step in the development process was whakawhanaungatanga so that the various people involved in the project could begin to establish partnerships and relationships that would provide strength and inspiration during their development process (Education Gazette Editors [EGE], 2025). Furthermore, whakawhanaungatanga enabled Grbic (2016) to establish and maintain ongoing relationships with his project partners. The relationships established allowed the author to hear community and kaumātua feedback, advice, and suggestions. Grbic (2016) also stated the importance of their relationships in upholding core te ao Māori principles and tikanga. Lastly, Saha et al. (2024) spoke to the critical role whakawhanaungatanga played in building trust and communication within their research team. The team repeatedly reiterated the importance whanaungatanga played at every point of their research project.

Within Education Technologies

Whakawhanaungatanga was also central within the digital technologies created. As a core Māori principle, whanaungatanga facilitates and guides interpersonal interactions and relationships by creating space for individuals to establish, and maintain, relationships (Saha et al., 2024). Armstrong (2022) spoke to the relationship between learning and health, arguing that students struggle to learn when their health is not looked after. Drawing from Mason Durie's health model Te Whare Tapa Whā, she noted that strong healthy social relationships were an integral part of a student's well-being and should be accounted for in education spaces. Rood and Barbour's research (2024) echoes Armstrong's findings by showing that relationships play an important role in digital learning. They found that quality teacher-student relationships were strongly

associated with academic achievement and that relationships were vital in the education of Māori students.

Notably, creating relationships within the digital space is harder than in person. Rood and Barbour (2024) found that teachers have to work harder to create relationships and students expressed difficulty with creating and maintaining relationships through digital education. Tiakiwai and Tiakiwai (2010), found that students in poorly managed digital learning spaces experienced high levels of isolation and anxiety. However, teachers and students alike understood the importance of relationships in learning environments and efforts to develop relationships were undertaken from both ends (Tiakiwai & Tiakiwai, 2010).

Furthermore, students still desired and expected relationships with their peers and teachers (Rood & Barbour, 2024). At Tairangi School, their digital education programme reimagined how students can connect with one another through te ao Māori. They want to create a digital education tool that will act as a platform for ākonga Māori to share pūrākau. The research group comment on the importance of ākonga Māori sharing pūrākau between themselves as a way of building interpersonal relationships, “When tamariki tell their own stories, they’re building a stronger connection to themselves, their communities, and the world around them” (EGE, 2025, p.3).

Kanohi ki te Kanohi

Notably, however, from a te ao Māori lens, relationships can never be solely digital. Kanohi ki te kanohi (the act of being seen and/or known), is integral to te ao Māori (Tiakiwai & Tiakiwai, 2010). While a relationship can exist largely online, kanohi ki te kanohi is considered to be essential in establishing trust and deepening relationships. Developers often met in person to form the beginnings of a research relationship and learners stressed the importance of incorporating kanohi ki te kanohi interactions into their online learning. One online learning teacher dedicated many weekends to travelling to meet her students and their whānau in person (Tiakiwai & Tiakiwai, 2010).

Yet from another perspective, digital learning environments also allow students to maintain more kanohi ki te kanohi relationships with their whānau and hapū (Rood & Barbour, 2024). Without access to digital learning, rural students would need to travel away from home in order to pursue

education. Now that education can be accessed virtually, ākonga Māori are able to stay at home and within their communities. In addition to ākonga Māori, kaiako also benefit from digital learning. Rood and Barbour (2024) found that an increase in digital learning environments in rural populations meant that specialised teachers could stay in their communities and no longer had to migrate to urban centers for work.

Pedagogy

Technologically Responsive Pedagogy

Despite the relevance of teaching pedagogy to education environments, various authors found that little thought was put into developing technologically responsive pedagogies. Tiakiwai and Tiakiwai (2010) suggested that professional development was focused mainly on navigating new technologies rather than on the impacts the technologies would have on teaching and learning experiences. Whatarau (2019) noted that there was highly conflicting evidence on whether or not education providers develop digitally specific pedagogy alongside the adoption of digital tools.

Despite the lack of consideration of technologically responsive pedagogy, it is vital to the success of the digital learning environment. Rood and Barbour (2024) highlight that pedagogy is essential to effective online teaching. Blewden et al. (as cited in Rood & Barbour, 2024), also find that developing online pedagogy that effectively engages with digital tools enables learner success. Due to the vast differences between in-person and online learning and teaching, teaching pedagogies must change to fit online spaces better.

Culturally Responsive Pedagogy

Kaupapa Māori education has long emphasised the inclusion of te ao Māori principles and values in the education of ākonga Māori. This was echoed by Rood and Barbour (2024) who noted that ākonga Māori had specific learning needs and addressing those needs in virtual learning spaces was essential.

Whatarau (2019) explores the relationship between culturally responsive pedagogies and education outcomes for ākonga Māori. He highlights whakapapa and the interconnectedness of all things as central to Māori education. Without an understanding of how they connect to the world around them, there is no foundation on which ākonga Māori can rest their learning. As a

result, the lack of culturally responsive education has severely limited ākonga Māori resulting in poor education statistics among young Māori (Whatarau, 2019). The importance of cultural connectedness is reiterated by Armstrong (2022) who argues that where older Western research viewed culture as a learning obstacle, recent research has started to recognise the strong connection between cultural identity and positive wellbeing outcomes.

Poipoia te kākano kia puawai

Nurture the seed, and it will flourish

Encompassed by the whakataukī above, the notion that a culturally responsive pedagogy is needed to focus on the wider well-being of the child frequently appeared. Māori health models differ strongly from Western models by including multiple aspects of health such as spiritual, whānau and emotional health, whereas Western models tend to focus solely on physical health (Armstrong 2022). Due to the hegemonic nature of Western knowledge systems, the wellbeing of ākonga Māori is not being properly addressed. Moreover, the strong connection between well-being and growth has meant that the neglected wellbeing of ākonga Māori has led to poor education outcomes (Armstrong, 2022). Therefore, culturally responsive pedagogies that account for Māori education and wellbeing practices must be central to the education of ākonga Māori.

Barriers and Limitations

Digital Inequalities

Historic marginalisation in education and technological sectors has led to severe digital inequalities for Māori. Research shows these digital inequalities hinder educational outcomes and negatively impact wellbeing (Ka'ai et al., 2022). The digital inequalities experienced by Māori in relation to non-Māori are commonly referred to as a digital divide. The digital divide and its consequences are a source of major consideration in the development of Māori digital technologies. Worryingly, Rood and Barbour (2024) found that the digital divide had been exacerbated by COVID-19. In Aotearoa New Zealand the government response to COVID-19 was aggressive and tight lockdowns were implemented across the country. The strategy was successful in holding off COVID-19 until a vaccine became available, however, the strategy had

profound negative impacts on the already deep digital divide between Māori and non-Māori (Rood & Barbour, 2024).

Lack of Evaluation

An issue raised by Tiakiwai and Tiakiwai (2010) was the lack of data on the relationship between the efficiency of technology and gains in increased student achievement. They found that the improvement of digital infrastructure is costly for schools and little research is available on the benefits of upgrading digital technologies. Where cost is a major factor in the engagement with e-learning programmes, a lack of research into this relationship is unhelpful. Moreover, schools are often unable to fund digital strategies without ongoing support from external organisations (Tiakiwai & Tiakiwai, 2010).

Rood and Barbour (2024) also explore the evaluation of digital technologies in education and reach a similar understanding to Tiakiwai and Tiakiwai (2010). By examining multiple case studies, Rood and Barbour (2024) found that while the effects of digital technologies in education had been explored, often the research resulted in strategies and recommendations that did not specifically relate to the experiences of students. Moreover, the research conducted rarely focused specifically on ākonga Māori or low-performing students. Barbour reflects on the lack of evaluation of virtual education, arguing that it is a major issue in much of the literature related to digital learning (Rood & Barbour, 2024).

Professional Development

A general lack of support for students in the transition from physical to virtual learning spaces appeared frequently in the literature. Rood and Barbour (2024) found that students often needed support to build up skills and understandings that allowed them to efficiently utilise digital technologies for educational purposes. Tiakiwai and Tiakiwai (2010) also noted that students were occasionally constrained by accessibility issues and a lack of adequate digital training. Albeit, some developers are considering these issues. For example, the kaiako at Tairangi School put measures in place to mitigate this phenomenon. They had recognised that taura needed to become more comfortable with virtual learning before they introduced new digital technologies

and developed ways they could engage ākongā Māori with the possibility of new technologies as well as teaching them digital skills (EGE, 2025).

The importance of supporting students in the transition from physical to virtual spaces was coupled with the importance of professional development for kaiako. In order to effectively teach in a virtual space, the kaiako at Tairangi School identified the need to upskill themselves (EGE, 2025). They found that their professional development programme not only taught them new skills but dissipated feelings of fear and doubt related to teaching in a digital space. Rood and Barbour (2024) note that the transition to virtual teaching caused kaiako to experience the same stress and workload they did as a new teacher, indicating that the transition to virtual teaching requires kaiako to relearn and redevelop their teaching pedagogy and strategy. Tiakiwai and Tiakiwai's (2010) findings mirrored that of Rood and Barbour (2024), suggesting that Māori immersion virtual learning environments severely lacked skilled kaiako causing the systems to produce undue stress.

DISCUSSION

In this section, each research aim is addressed in regards to the findings from the literature review. The key themes identified provide strong indications of how the development of digital tools for kanorau-ā-roto Māori can be supported by a set of principles that align with kaupapa Māori theory.

Aim 1:

To explore how kanorau-ā-roto is understood within te ao Māori and how these understandings shape the experiences of kanorau-ā-roto Māori learners in education contexts.

Key findings:

- There was no traditional definition of kanorau-ā-roto in te ao Māori because it was not necessary to daily life (Jones et al., 2024).

- When kanorau-ā-ro-ro, and disabilities more generally, appeared in Māori histories, they were regarded favourably and often compared to atua like characteristics or possessed immense knowledge (Jones et al., 2024).
- Kanorau-ā-ro-ro, disabled ākonga Māori, and whānau speak positively about their relationships with te ao Māori and often express a desire to strengthen their connections to te ao Māori (Riwai-Couch, 2021).
- Māori notions of acceptance and whanaungatanga create welcoming environments for kanorau-ā-ro-ro (Jones et al., 2024).

Aim 2:

To examine how digital tools are currently designed, implemented, and accessed by Māori, with a particular focus on their impact on kanorau-ā-ro-ro learners' wellbeing, identity, and learning outcomes.

Key findings:

- Digital tools are currently being designed in accordance with tikanga Māori, kaupapa Māori and Māori data sovereignty principles in order to ensure the protection of Māori data and interests from hegemonic third-parties (Munn, 2024).
- Digital tools are being developed from conceptual frameworks inspired by te ao Māori. The use of Māori conceptual frameworks helps ground the digital technology to foundational Māori principles and values (Grbic, 2016).
- Digital technologies should be developed in a way that centers the user and ensures their needs are met through strengths-based models of care (Tiakiwai & Tiakiwai, 2010).
- Digital technologies developed for kanorau-ā-ro-ro should be developed for the collective use of the individual and their whānau network (Berryman & Woller, 2013).

Aim 3:

To identify culturally grounded, mana-enhancing practices and design principles that can support the development of digital tools that better serve kanorau-ā-ro-ro Māori learners in education contexts.

Key findings:

- It is critical that the development of digital tools is accompanied by reliable access to services and paths to development for the intended users. Without a nuanced understanding of the targeted group of schools or ākonga Māori it is likely the tool will not be able to be used as it was intended.
- Kaupapa Māori must inform the development of digital technologies from the onset to prevent any actions that might undermine tikanga Māori or unwittingly sanction exploitative actions.
- The development of digital tools must be supported by culturally and technologically relevant professional development.
- Notions of whakapapa, whanaungatanga and Māori understandings of wellbeing should act as guiding principles in the development of digital technologies to ensure kanorau-ā-roro Māori are receiving culturally relevant care and education.
- The development of digital tools for kanorau-ā-roro must center a strengths-based approach to care and education that lifts up ākonga Māori and nurtures confidence and security.

CONCLUDING COMMENTS

In summary, the care of kanorau-ā-roro Māori and development of Māori informed digital technologies are still newly researched concepts. Despite the scarcity of research on these subjects, the literature is clear on the historical contexts and where the research must go from here. More research needs to be conducted on Māori care of kanorau-ā-roro, and on how to ensure digital learning spaces are culturally responsive. The literature was also clear that there is an intense need to evaluate the effectiveness of emerging Māori digital technologies to identify the practical applications of research.

Additionally, there was also a clear message in the fields of both kanorau-ā-roro and digital technologies that pedagogy and professional development must keep pace with emerging

theories and models. Without trained educators and appropriate resourcing, ākongā Māori will not benefit from progressions in research or digital developments.

Finally, both strands of research emphasised the importance of relationships to Māori and indicated that they were able to strengthen relationships between whānau, hapū and iwi. For this reason, appropriately developed digital technologies for the education of kanorau-ā-roto Māori are likely to provide great benefits to the communities they provide for.

REFERENCES

- Armstrong, D. (2022). *Using the Meke Meter to understand rangatahi hauora in the Aotearoa New Zealand secondary school context* [Unpublished master's thesis]. Eastern Institute of Technology (EIT), New Zealand. <https://hdl.handle.net/10652/5779>
- Berryman, M., & Woller, P. (2013). Learning about inclusion by listening to Māori. *International Journal of Inclusive Education*, 17(8), 827–838. <https://doi.org/10.1080/13603116.2011.602533>
- Bevan-Brown, J. (2013). Including people with disabilities: an indigenous perspective. *International Journal of Inclusive Education*, 17(6), 571–583. <https://doi.org/10.1080/13603116.2012.694483>
- Cliffe-Tautari, T. (2020). Using pūrākau as a pedagogical strategy to explore Māori cultural identities. *Set: Research Information for Teachers*, 1. <https://doi.org/10.18296/set.0156>
- Cram, F., & Adcock, A. (2022). Kaupapa māori research. In *Handbook of qualitative cross-cultural research methods* (pp. 56-84). Edward Elgar Publishing. <https://doi.org/10.4337/9781800376625.00013>
- Education Gazette Editors. (2025). Pūrākau, place and digital learning: helping tauira share their stories. *Education Gazette*. https://openaccess.wgtn.ac.nz/articles/journal_contribution/P_r_kau_place_and_digital_learning_helping_tauira_share_their_stories/29433782/1/files/55760297.pdf
- Grbic, V. (2016). *Virtualising the stories of Ngākau Māhaki mā te whare e arahi: Let the whare be the guide* [Unpublished master's thesis]. Unitec Institute of Technology, New Zealand.
- Hickey, H & Wilson, D. (2017). Whānau hauā: Reframing disability from an Indigenous perspective. *MAI Journal*, 6(1), 82-94. [10.20507/MAIJournal.2017.6.1.7](https://doi.org/10.20507/MAIJournal.2017.6.1.7)
- Hudson, P., & Whaanga, H. (2024). Decolonizing digital spaces of racism. In *Handbook of critical whiteness: Deconstructing dominant discourses across disciplines* (pp. 783-798). Singapore: Springer Nature Singapore.

- Jones, B., King, P.T., Baker, G., Nikora, L.W., Hickey, H., Perry, M., Pouwhare, R. and Ingham, T.R. (2024), Karanga rua, karanga maha: Māori with lived experience of disability self-determining their own identities. *Kōtuitui: New Zealand Journal of Social Sciences Online*, 19(1), 45-64. <https://doi.org/10.1080/1177083X.2023.2224422>
- Ka'ai, T., Nand, P., Moselen, H., Smith-Henderson, T., & Vallayil Vijayalekshmi, M. (2022). *Te Kōhanga o te Tūi: The potential of voice recognition technology and artificial intelligence (AI) to support the acquisition of te reo Māori and digital literacy in early child development - A literature review*. Te Ipukarea Research Institute. <https://www.teipukarea.maori.nz/assets/Uploads/Kaai-et-al-Te-Kohanga-o-te-tui-Literature-review.pdf>
- Ka'ai-Mahuta, R. (2019). Preserving indigenous voices: web archiving in Aotearoa/New Zealand. *Interaction Design and Architecture (s) Journal-IxD&A, Italy*, (41), 24-30. <https://doi.org/10.55612/s-5002-041-002>
- Kennedy, N., & Jefferies, R. (2009). *Kaupapa Māori framework and literature review of key principles*. IGCI, The University of Waikato. <https://researchcommons.waikato.ac.nz/server/api/core/bitstreams/81e7bbbc-e85e-4d04-a4db-bf3f681cceed/content>
- Kopua, D., & Skirrow, P. (2023). Racism, Mātauranga Māori and ADHD: An Interview With Dr Diana Kopua. *Journal of the New Zealand College of Clinical Psychologists*, 33(1), 72–78. <https://doi.org/10.5281/zenodo.8187808>
- Mirfin-Veitch, B., Jalota, N., & Schmidt, L. (2020). *Responding to neurodiversity in the education context*. Wellington: Ministry of Education. <https://disabilityconnect.org.nz/wp-content/uploads/responding-to-neurodiversity-beasley-institute-1.pdf>
- Munn, L. (2024). The five tests: designing and evaluating AI according to indigenous Māori principles. *AI & Soc* 39, 1673–1681. <https://doi.org/10.1007/s00146-023-01636-x>

- Pihama, L., Cram, F., & Walker, S. (2021). Creating methodological space: A literature review of kaupapa Māori research. *Canadian Journal of Native Education*, 26(1), 30-43.
<https://doi.org/10.14288/cjne.v26i1.195910>
- Queniahān, M. (2024). *Guidelines to ensure Māori Data Sovereignty in the ICT sector of Aotearoa New Zealand* [Master's thesis, Auckland International Campus, Otago Polytechnic]. Research Bank. <https://doi.org/10.34074/thes.6759>
- Rameka, L. K. (2021). Kaupapa Māori assessment: Reclaiming, reframing and realising Māori ways of knowing and being within early childhood education assessment theory and practice. In *Frontiers in Education*, 6, 1-8. doi: 10.3389/feduc.2021.687601
- Rangiwai, B. (2024). Flighty like the pīwakawaka!: personal reflections on mid-life ADHD diagnosis and the beginnings of a framework for conceptualising the condition from a Māori perspective. *AlterNative: An International Journal of Indigenous Peoples*, 20(3), 360-369. <https://doi.org/10.1177/11771801241250058>
- Riwai-Couch, M. (2021). *Poipoia ngā ākongā kanorau ā-roro: A literature review prepared for the Ministry of Education*.
<https://inclusive.tki.org.nz/assets/inclusive-education/resources/files/Akongā-Kanorau-a-roro-Final-Draft-of-Literature-Review-MRC-1.pdf>
- Rood, C., & Barbour, M. (2024). Virtual learning for Maori students: Examining culturally responsive pedagogies and equity. *Journal of Open, Flexible and Distance Learning*, 28(1), 8–27.
<https://search.informit.org/doi/10.3316/informit.T2025010600004501300730839>
- Saha, S., Tapuke, K., Tapuke, S., Kennedy, B., Tolbert, S., & Macfarlane, A. (2024). Braiding mātauranga Māori and volcanology to co-design educational resources. *He Awa Whiria: Braiding the knowledge streams in research, policy and practice*.
<https://oercollective.caul.edu.au/braiding-knowledge-research-policy-practice/chapter/braiding-matauranga-maori-and-volcanology-to-co-design-educational-resources-a-he-awa-whiria-approach/>

- Smith, G. H. (2003, December). Kaupapa Māori theory: Theorizing Indigenous transformation of education & schooling [Paper presentation]. Kaupapa Māori Symposium NZARE/ AARE Joint Conference, Auckland.
<https://www.aare.edu.au/data/publications/2003/pih03342.pdf>
- Smith, L. T. (2015). Kaupapa Māori research - some kaupapa Māori research principles. In L. Pihama & K. South (Eds.), *Kaupapa rangahau a reader: A collection of readings from the kaupapa Māori research workshop series led* (pp. 46-52). Te Kotahi Research Institute.
<https://hdl.handle.net/10289/12026>
- Smith, L. T. (2017). Towards developing indigenous methodologies: Kaupapa Māori research. In Hoskins, T & Jones, A (Eds.), *Critical Conversations in Kaupapa Maori* (pp. 23–36). Huia Publishers.
- Tiakiwai, S., & Tiakiwai, H. (2010). *A literature review focused on virtual learning environments (VLEs) and e-learning in the context of te reo Maori and Kaupapa Māori education* (Report to the Ministry of Education) Wellington: Ministry of Education.
- Tipene, C. M. (2023). *Whānau Māori and their experiences of attention-deficit/hyperactivity disorder: implications for clinical practice* [Doctoral thesis, Massey University]. Massey Research Online.
<https://mro.massey.ac.nz/items/8bf918ae-8ae4-4e0d-9600-359c8af78041>
- Tupou, J., Ataera, C., Wallace-Watkin, C., & Waddington, H. (2024). Supporting tamariki takiwātanga Māori (autistic Māori children): Exploring the experience of early childhood educators. *Autism*, 28(3), 705-717. <https://doi.org/10.1177/13623613231181622> (Original work published 2024)
- Whatarau, B. (2019). *A digital learning framework for rangatahi based on Māori waka culture* [Unpublished master's thesis]. The University of Otago.

